

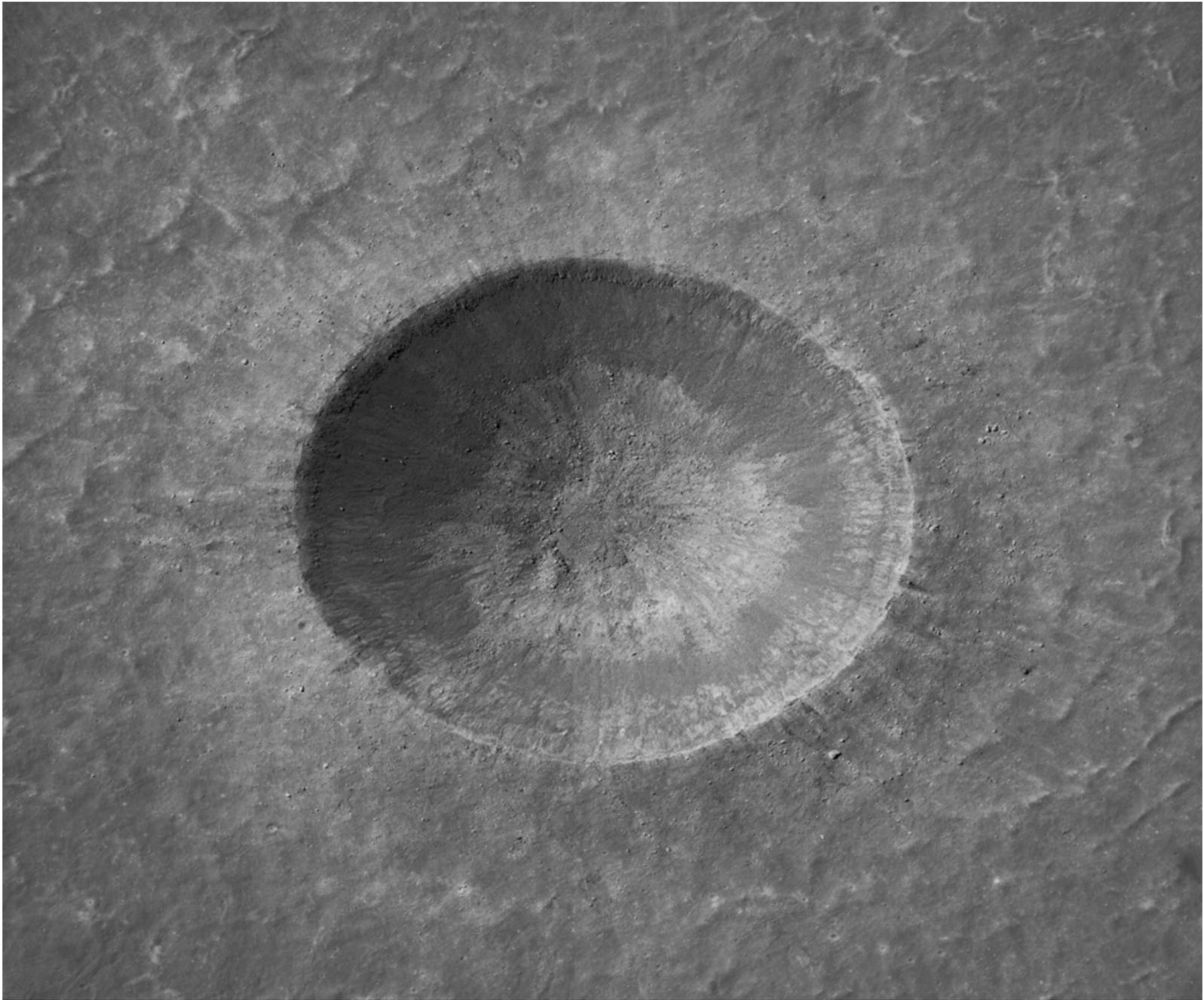


National Aeronautics and
Space Administration

LRO | 2011

Lunar Reconnaissance Orbiter





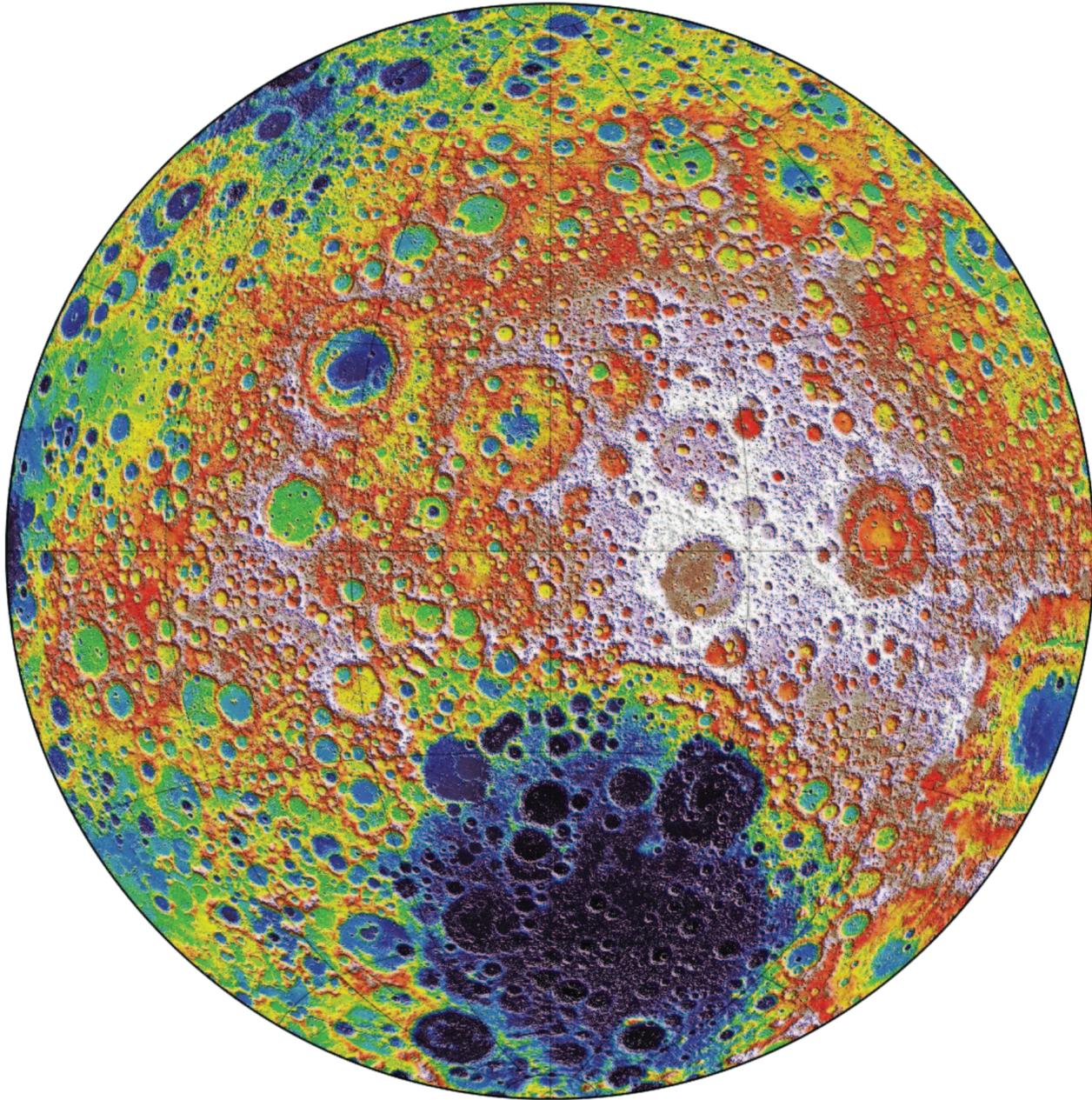
JANUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	New Years Day 1
2	3	4	5	6	7	8
		1959 Luna 1 (USSR) First Lunar Flyby 				
9	10	11	12	13	14	15
						
16	Martin Luther King Jr. Day 17	18	19	20	21	22
			Full Wolf Moon 			
23	24	25	26	27	28	29
						
30	31					



Linné Crater

The Linné crater (2.2 km diameter) is a beautifully preserved young mare crater. Since the Moon has no atmosphere, no wind, and no rain, features on the surface are preserved for millions of years. The exact age of Linné crater is not known, although it is thought to be less than ten million years old. This LROC images show a richness of detail that confirm this young age.



MARCH

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
27	28	1	2		4	5	
6	7	8	9	10	11		
Daylight Saving Time Begins	13	14	15	16	17	18	19
20	21	22	23	24	25	26	
27	28	29	30	31			

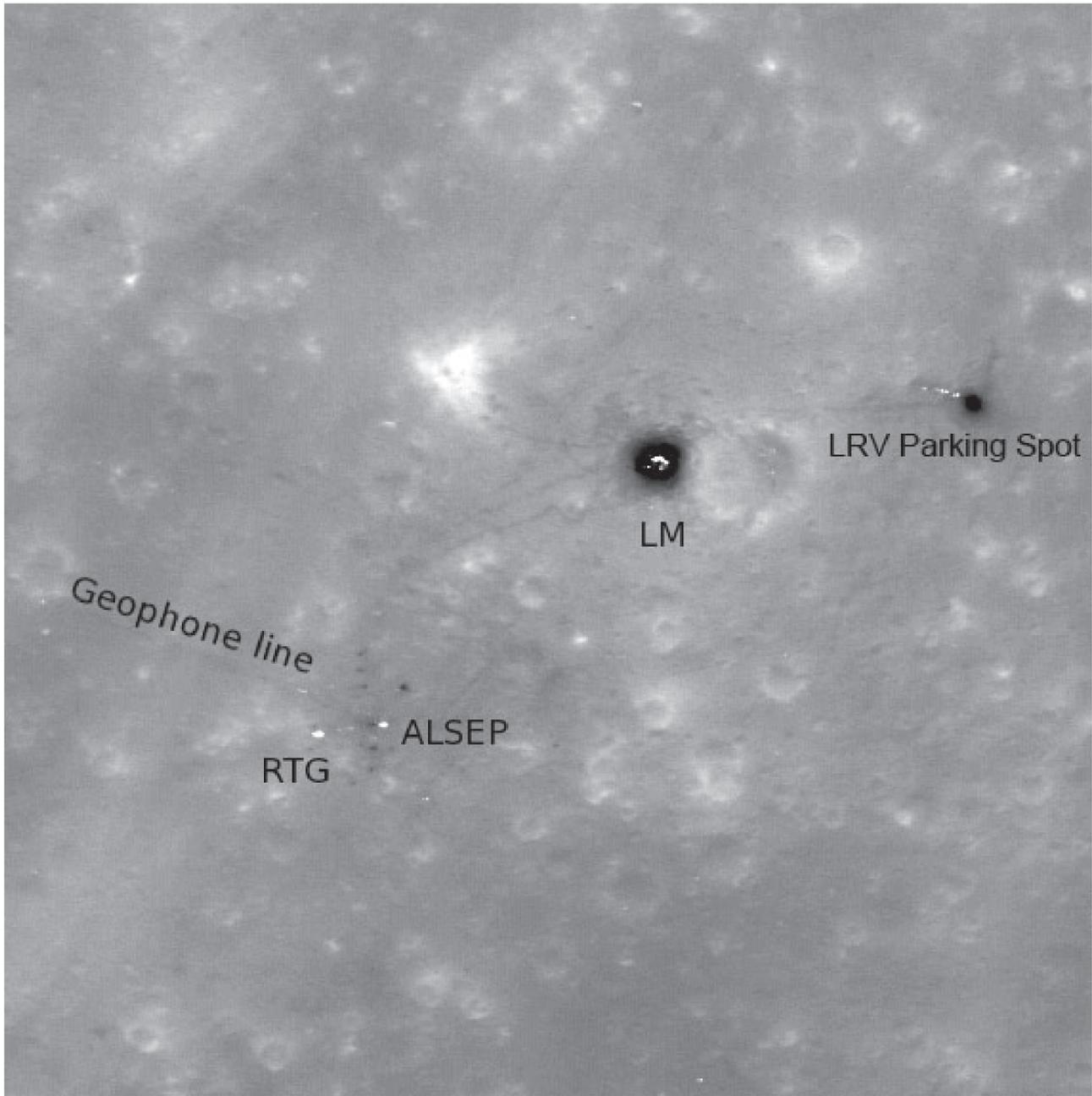
1959 Pioneer 4
First USA flyby 

Full Worm Moon 



Far Side of the Moon

Tidal forces between the moon and the Earth have slowed the moon's rotation so that one side of the moon always faces toward our planet. Though sometimes improperly referred to as the "dark side of the moon," it should correctly be referred to as the "far side of the moon" since it receives just as much sunlight as the side that faces us. LRO's Lunar Orbiter Laser Altimeter (LOLA) instrument is providing new details about the entire half of the moon that is obscured from Earth.



APRIL

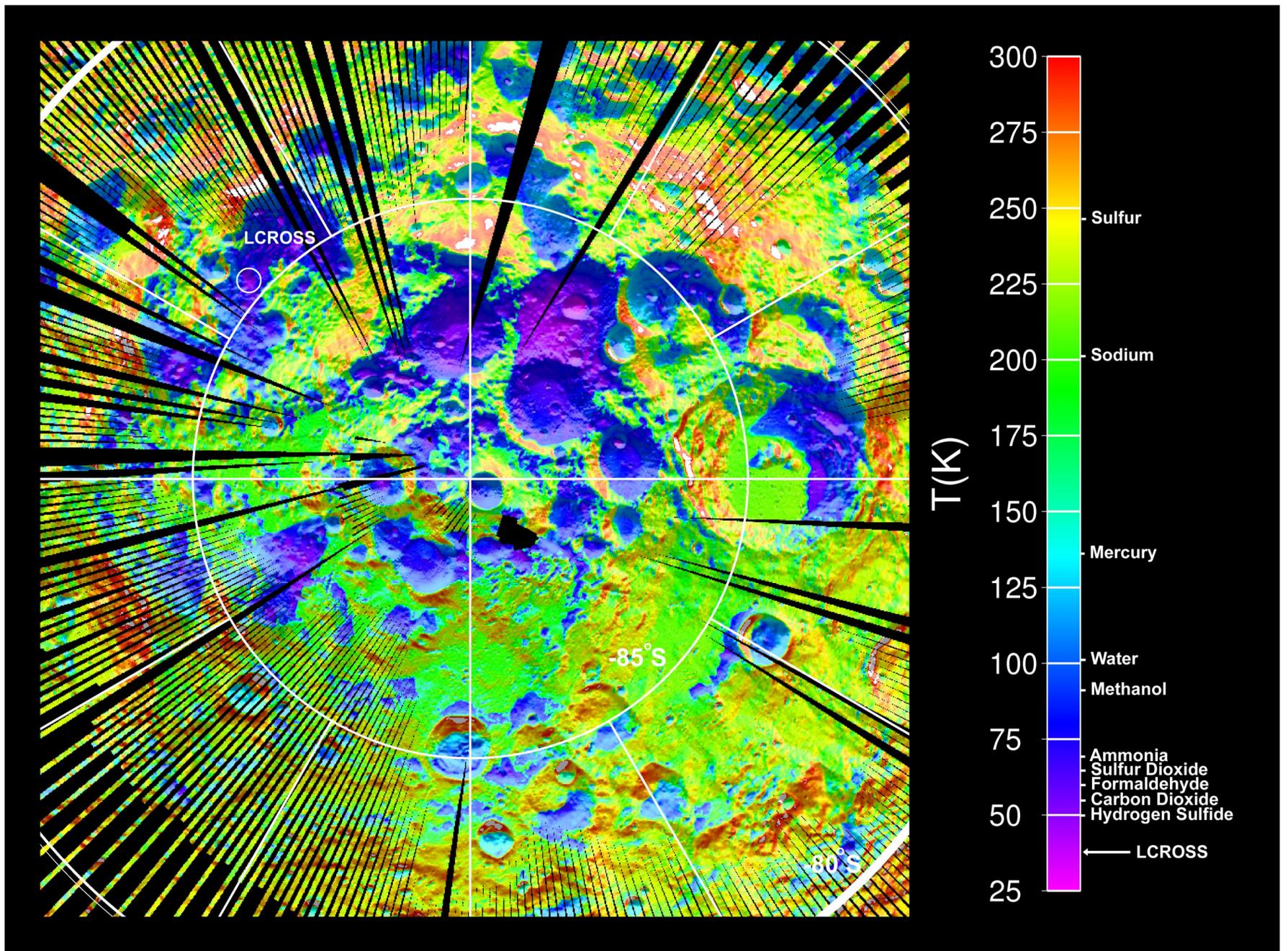
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
 17	 18	1961 Vostok 1 (USSR) First manned orbital spaceflight	20	21	22	23
1970 Apollo 13 crew returned safely to Earth.	Full Pink Moon  25	26	1972 Apollo 16 (USA) Fifth manned lunar landing	27	28	29
24	 25	1962 Ranger 4 First USA Impact	26	27	28	29
	Footprints left on the Moon by Apollo astronauts will remain visible for at least 10 million years because there is no erosion on the Moon.					



Apollo Landing Site

High-sun image of the Apollo 16 landing site showing the lunar module descent stage, various pieces of equipment, and disturbed lunar soil (seen as darker lines and areas) which marks where John Young and Charles Duke traversed in the spring of 1972.





MAY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
		☉		1961 Freedom 7 (USA) First manned suborbital spaceflight		
Mother's Day	8	9	10	11	12	13
		☾				
15	16	17	18	19	20	21
		Full Flower Moon				
22	23	24	25	26	27	28
		☾	1961 President Kennedy announced goal of sending an American safely to Moon before end of the decade			
29	Memorial Day	30	31	<p>“ NASA has convincingly confirmed the presence of water ice and characterized its patchy distribution in permanently shadowed regions of the moon. This major undertaking is the one of many steps NASA has taken to better understand our solar system, its resources, and its origin, evolution, and future...”</p> <p>- Michael Wargo, NASA Chief Lunar Scientist</p>		



Surface Temperature

LRO Diviner Lunar Radiometer Experiment surface temperature map of the south polar region of the Moon. The data were acquired during September and October, 2009 when south polar temperatures were close to their annual maximum values. The map shows the locations of several intensely cold impact craters that are potential cold traps for water ice as well as a range of other icy compounds commonly observed in comets. The approximate maximum temperatures at which these compounds would be frozen in place for more than a billion years is shown next to the scale on the right.



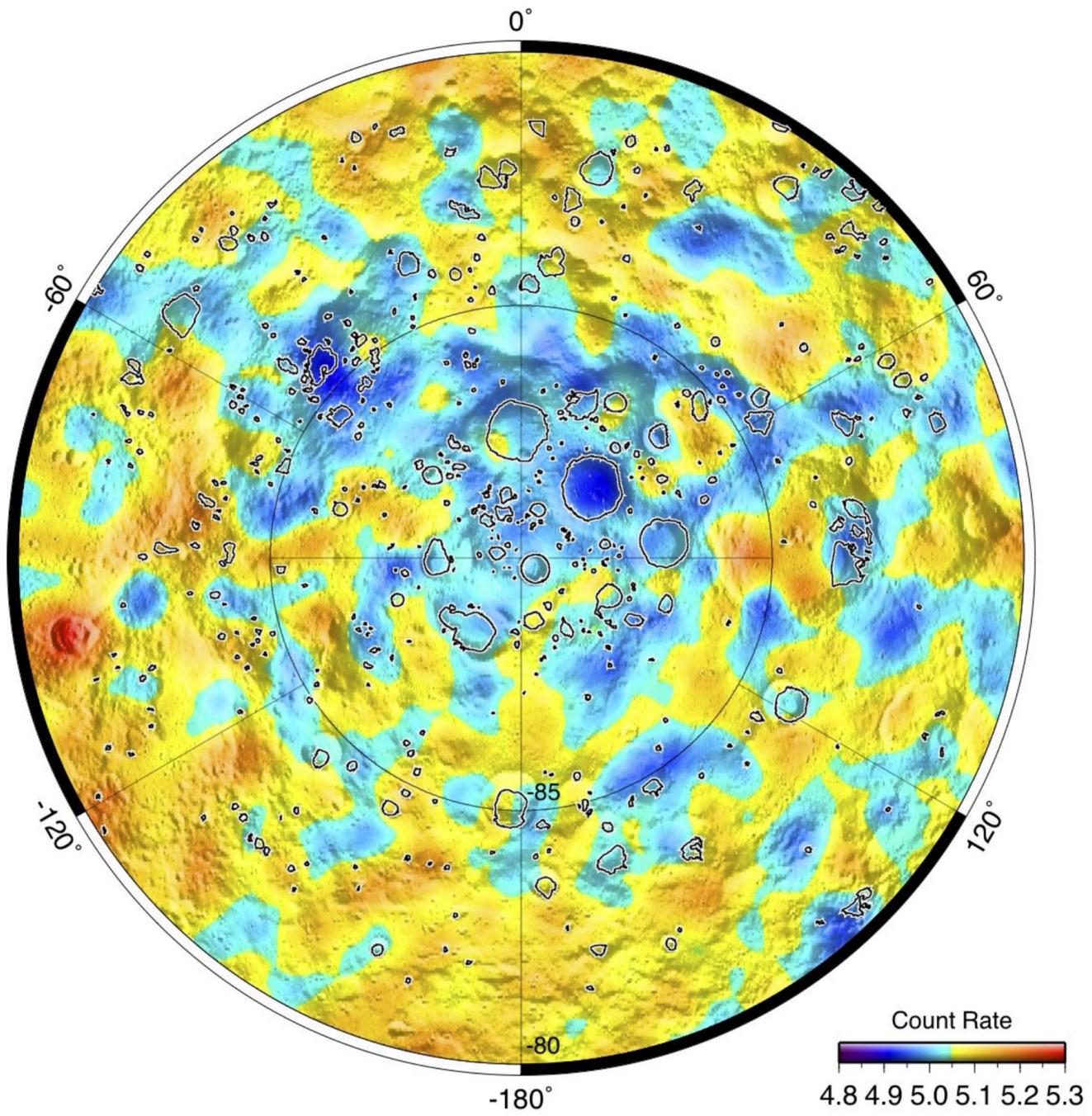
JUNE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	1 ☉	2 1966 Surveyor 1 First (USA) robotic lander	3	4
5	6	7	8	9 ☾	10	11
12	13	Flag Day	14	15 Lunar Eclipse Full Strawberry Moon	16	17
18	19	20	21	22	23 ☾	24
25	26	27	28	29	30	2009 LRO Exits The Planet Earth!
Father's Day	19	20	21	22	23	24
25	26	27	28	29	30	2009 LRO Exits The Planet Earth!



LRO Launch

Smoke rolls across Launch Pad 41 at Cape Canaveral Air force Station in Florida as the Atlas V/Centaur rocket topped with NASA's Lunar Reconnaissance Orbiter (LRO), and NASA's Lunar Crater Observation and Sensing Satellite (LCROSS), lifts off. Launch was on-time at 5:32 p.m. EDT June 18, 2009.



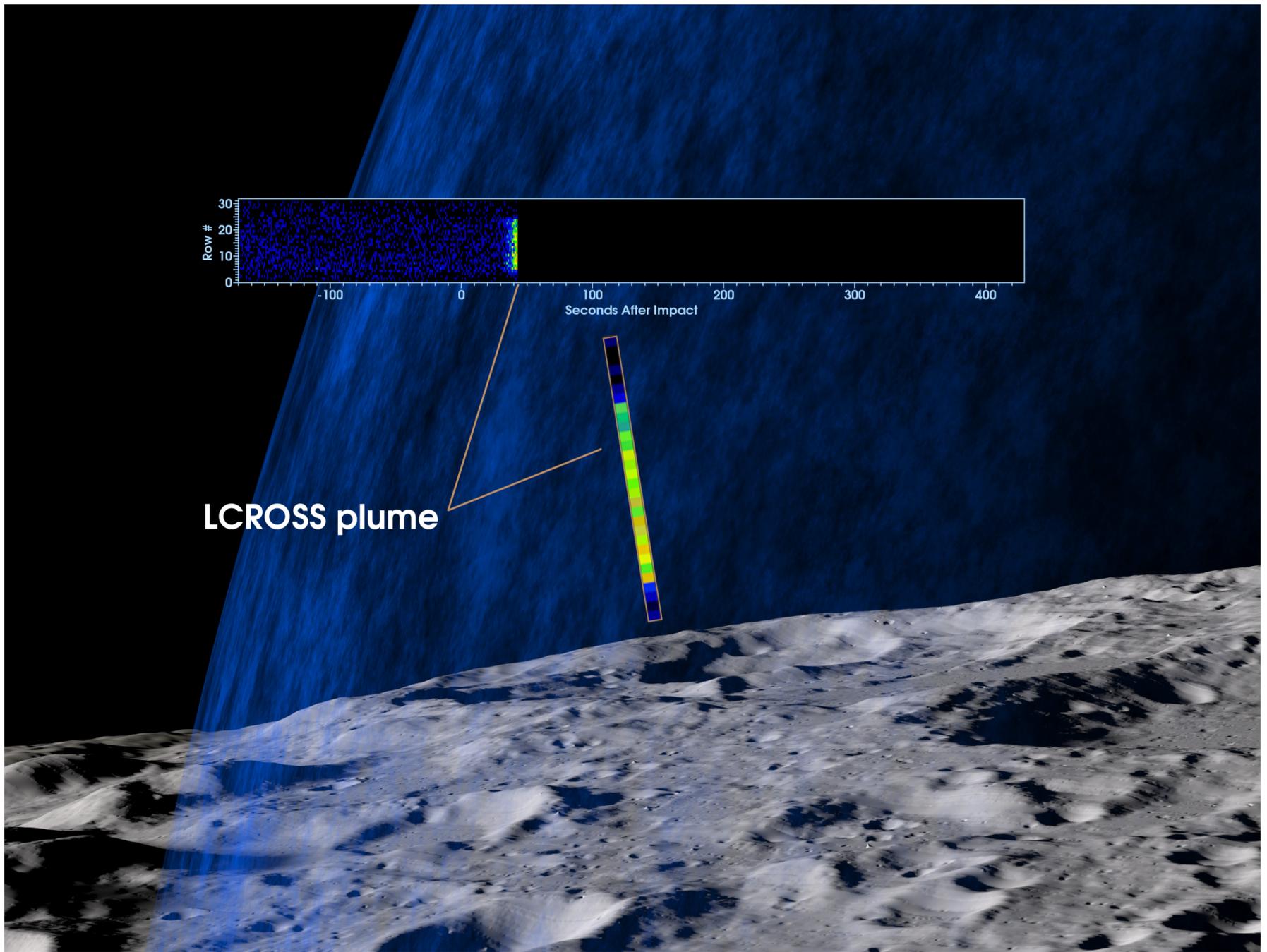
JULY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
26	27	28	29	30	1 ☉	2	
3	Independence Day 4	5	6	7	8 ☾	9	
10	11	12	13	14	15 Full Buck Moon ●	16	
17	18	19	20	21	22	23 ☾	
24	25	26	1969 Apollo 11 (USA) Landed the first humans on the moon	27	28	29	30 1971 Apollo 15 (USA) 4th manned lunar landing and first use of lunar roving vehicle ☉
31		1609 Thomas Harriot is first to look at Moon through a telescope.					



LEND South Pole

Lunar Exploration Neutron Detector (LEND) is one of the instruments aboard NASA's Lunar Reconnaissance Orbiter (LRO). It is the first collimated neutron instrument to ever fly in space allowing it to achieve high spatial resolution for mapping neutron emission from the Moon. This view shows the neutrons count rate at the Moon's south pole, where a decrease of counts means higher content of hydrogen in regolith. Gray color and black contours represent surface relief and permanently shadowed regions. LEND is a contribution of the Russian Federation to the LRO mission developed under an Agreement between NASA and Roscosmos in Space Research Institute (IKI), Moscow.



AUGUST

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

1966 Lunar Orbiter 1 (USA) Photographs areas for selection of safe landing sites

Full Sturgeon Moon

The Moon is about 250,000 miles from Earth. It would take 130 days to reach the Moon travelling by car.

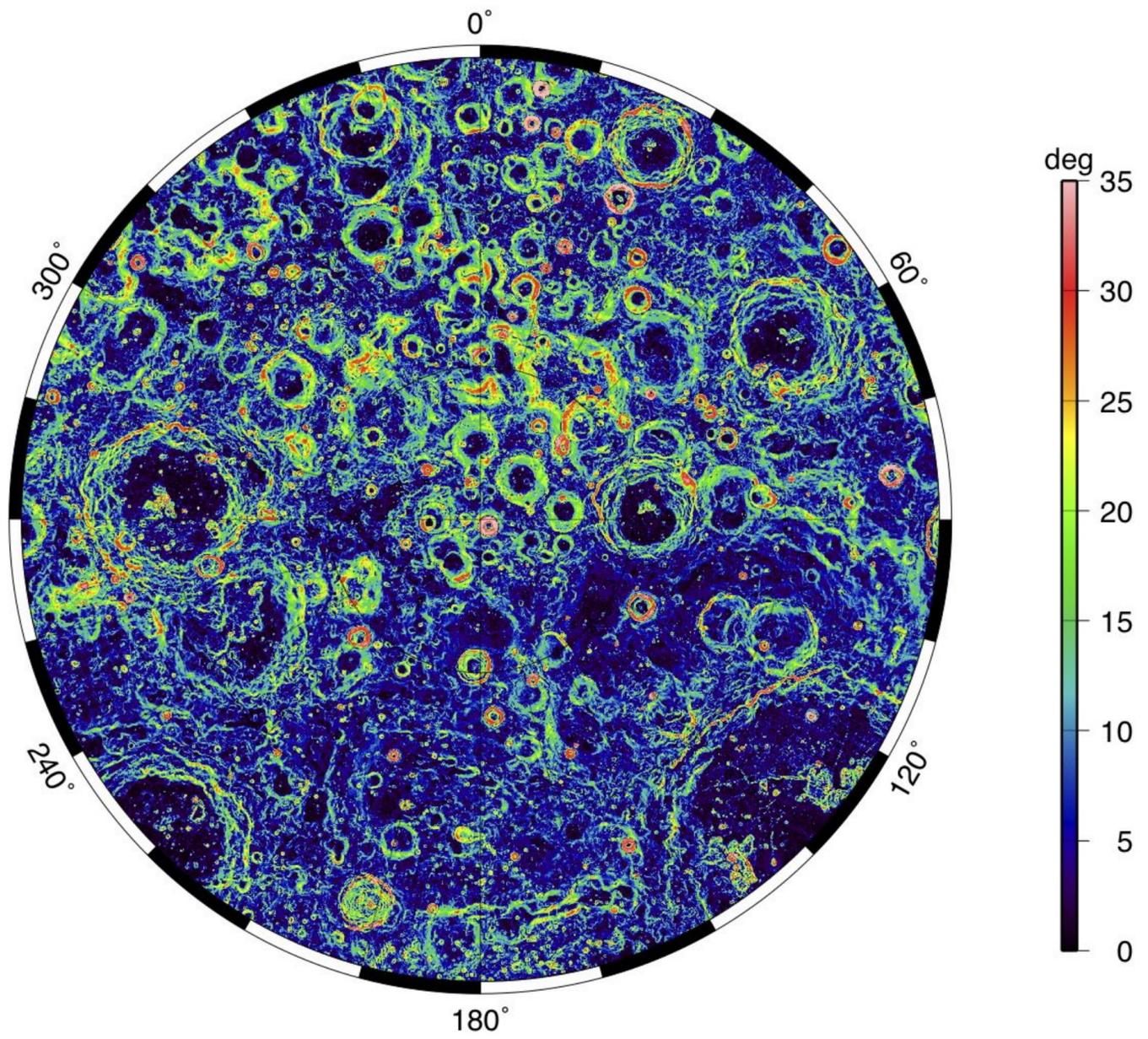
Did-You-Know?

The Moon has a diameter of 2,000 miles. The surface of the Moon has about the same area as the continent of Africa.

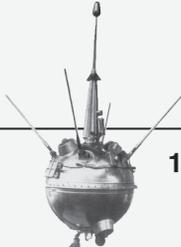


Chemical Elements

The Lunar Crater Remote Observation and Sensing Satellite (LCROSS), which launched with LRO, was intentionally crashed onto the Moon's surface Oct. 9, 2009, while LRO instruments watched. About 90 seconds after LCROSS hit the Moon, LRO flew past the debris plume raised by the impact, while the Lyman Alpha Mapping Project (LAMP) and other instruments collected data as depicted. Using these data, LAMP team members eventually confirmed the presence of the gases molecular hydrogen, carbon monoxide and atomic mercury, along with smaller amounts of calcium and magnesium, also in gas form.



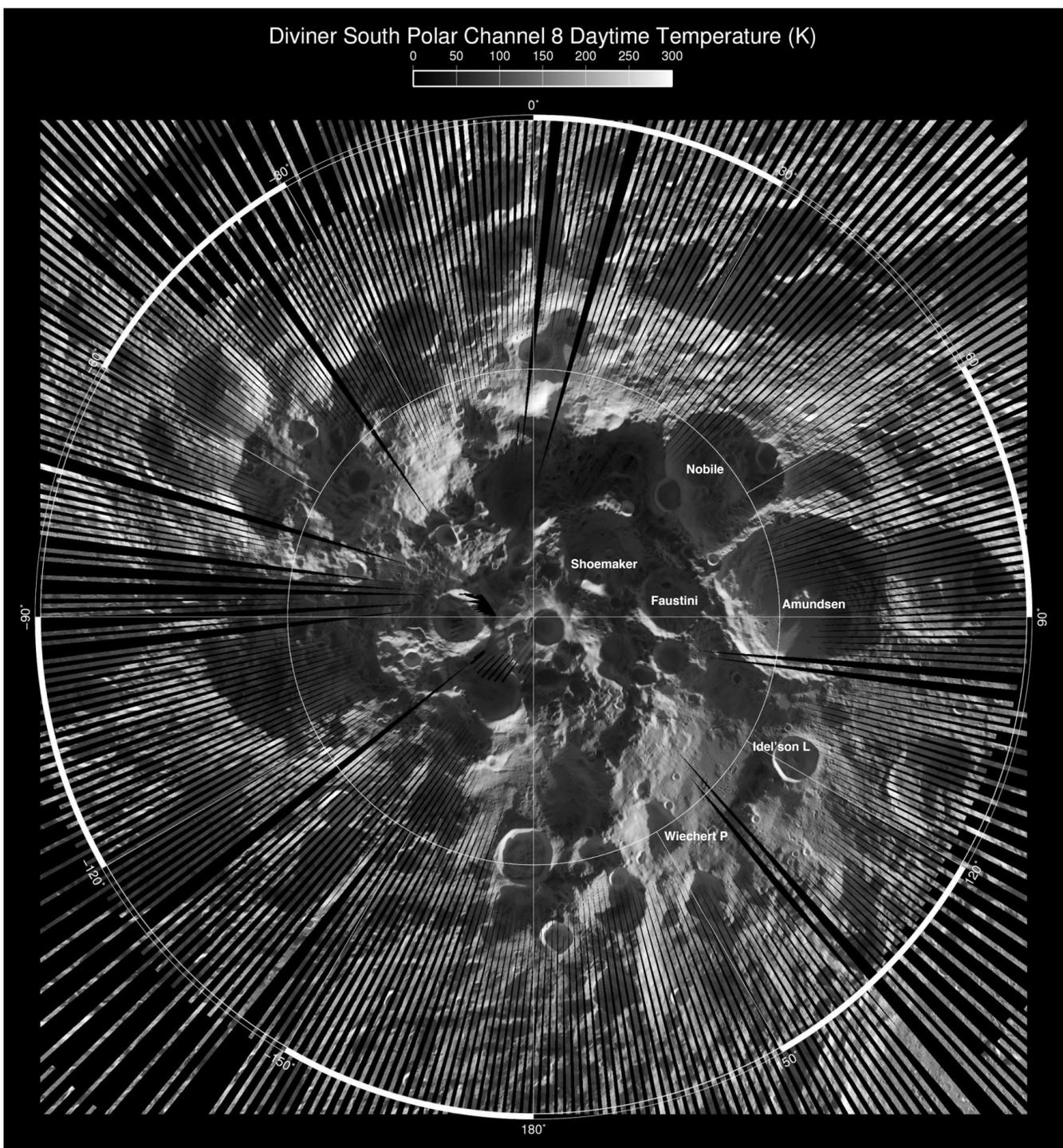
SEPTEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	31	1	2	3
4 ☾	Labor Day 5	6	7 	8	9	10
11	12 Full Corn Moon ●	13	14 1959 Luna 2 (USSR) The first spacecraft to impact the moon	15	16	17 Constitution Day
18	19	20 ☾	21	22	23	24
25	26	27 ○	28	29	30	31 1970 Luna 16 (USSR) First robotic sample returned to Earth



Starry Night

The surface slopes at the lunar south pole reveal a delicate pattern that reflects the distribution of craters, the relative smoothness of the crater floors and the steepness of their walls. The image derived from the laser altimeter (LOLA) data shows latitudes 75S to the pole with slopes on baselines of 240 meters. At the center of the image is the small crater Shackleton, 21 km in diameter and nearly 4 km deep, with sides as steep as 35 degrees giving it the reddish donut shape appearance in the image. The interior of Shackleton is in near permanent darkness.



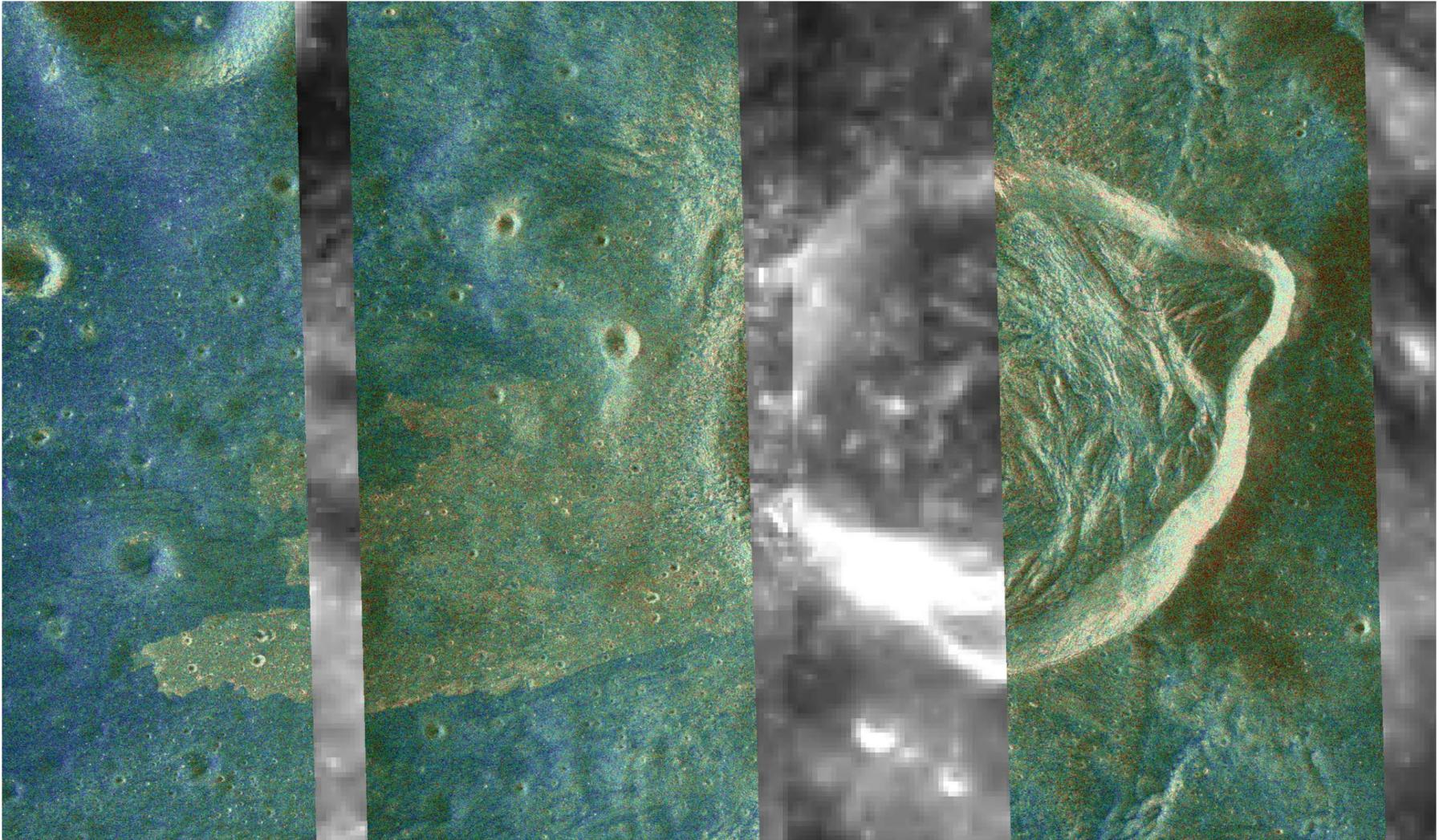
OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	Columbus Day 10	11	12	13	14	15
2009 LCROSS impacted Moon and confirmed the presence of water ice in a permanently shadowed Cabeus Crater (near South Pole)			Full Harvest Moon			
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	Halloween 31	 <p>The term "lunatic," was derived from the Latin "luna" or Moon. Do you think the full Moon has some unexplainable effect on our behavior?</p>				



Diviner's South Pole

This image is a high-resolution thermal map of the south polar region of the Moon. The map covers the region to 80° south latitude and was assembled from Diviner (Channel 8) observations obtained during July and August, 2009. Diviner's observations provide the first measurements of temperatures inside permanently shadowed polar craters that may contain deposits of cold-trapped water ice. (NASA/GSFC/UCLA)



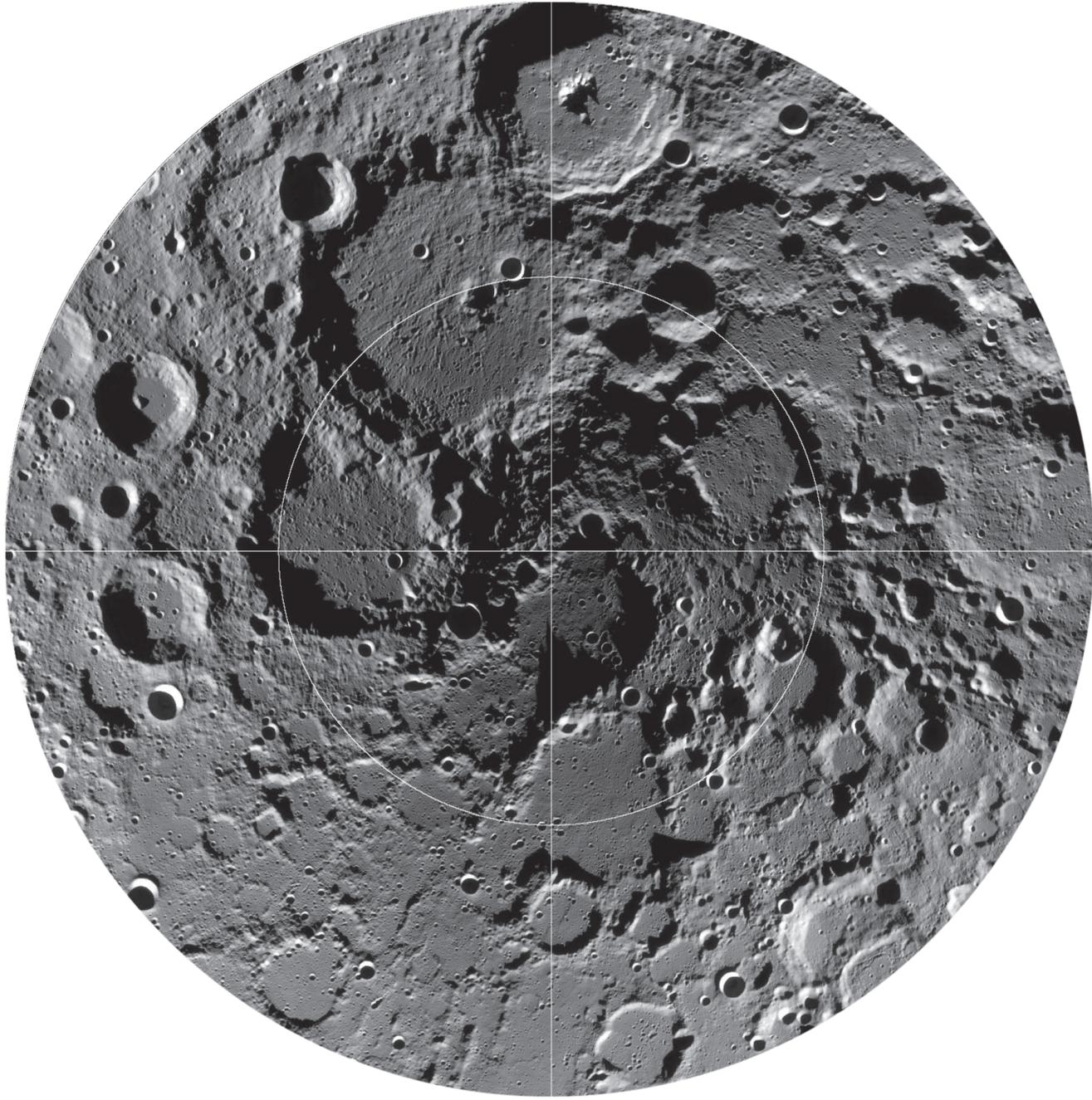
NOVEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31	1	2 ☾	3	4	5
Daylight Savings Time Ends 6	7	Election Day 8	9	10 Full Beaver Moon ●	Veterans Day 11	12
13	14	15	16	17 1970 Lunokhod 1 (USSR) First robotic rover	18 ☾	19 1969 Apollo 12 (USA) Second manned lunar landing
20	21	22	23	24	25 ○	26
27	28	29	30			
				<p>Moon - Gerasimovich D Earth - SP lava flow</p> <p>Many of the geological features seen in radar images of the Earth are also seen in the radar images from the Moon.</p>		



Gerasimovich D

This image shows the impact crater Gerasimovich D, a 26km diameter impact crater located at 22°S 122°W. The mosaic consists of colorized Mini-RF data overlaid on top of Clementine optical data. The radar data is sensitive to surface roughness and very clearly indicates the location of the melt sheet that was formed as part of the impact cratering process.



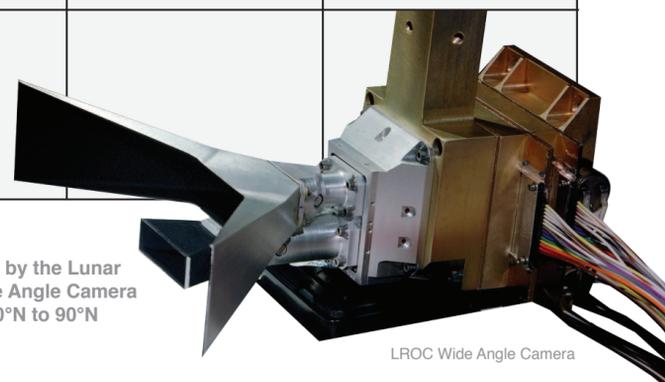
DECEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27	28	29	30	1	2 	3
4	5	6	7	8	9	10 Lunar Eclipse Full Cold Moon 
11 1972 Apollo 17 (USA) Sixth and final Apollo manned lunar landing	12	13	14	15	16	17
18 	19	20	21	22	23	24 1968 Apollo 8 (USA) First manned lunar orbiter 
Christmas Day 25	26	27	28	29	30	31



Lunar North Pole

Summer-time at the lunar north pole captured by the Lunar Reconnaissance Orbiter Camera (LROC) Wide Angle Camera (WAC), width ~600 km, latitude ranges from 80°N to 90°N [NASA/GSFC/Arizona State University].



LROC Wide Angle Camera